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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,691	10/22/2003	Eldon F. Mockry	87280.1652	4896

7590 03/14/2006

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EXAMINER	
GREENE, JASON M	

ART UNIT	PAPER NUMBER
1724	

DATE MAILED: 03/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/689,691	MOCKRY ET AL.	
	Examiner	Art Unit	
	Jason M. Greene	1724	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 5-26* is/are rejected.

7)☒ Claim(s) *3 and 4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/22/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims

1. The Examiner suggests Applicants rewrite the phrase "said first set passageway" in line 11 of claim 1 as "said first set of passageways" to correct a minor grammatical informality and to improve the readability of the claim language.

2. With regard to claim 13, the Examiner suggests Applicants rewrite the phrase "said first passageway and said second passageway" as "said first passageways and said second passageways" to improve the readability of the claim language by clarifying that there are a plurality of first and second passageways.

3. With regard to claim 14, the Examiner suggests Applicants rewrite the phrase "said first passageway" in line 5 as "said first passageways" to correct a minor grammatical informality.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 24 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Stark (US 5,816,315).

Stark teaches a method for reducing the heat content of an air stream comprising directing a first air stream (50) through a first set of passageways (53) of a generally diamond shaped heat exchanger (40), directing a second air stream (52) through a separate, second set of passageways (55) of the generally diamond shaped heat exchanger, transferring heat from said first air stream into said second air stream, and condensing water out of the first air stream and capturing the water condensed out of the first air stream in a reservoir in Figs. 2 and 3, col. 3, line 39 to col. 4, line 6 and col. 6, line 37 to col. 7, line 14.

6. Claim 26 is rejected under 35 U.S.C. 102(b) as being anticipated by Stark (US 5,816,315).

Stark discloses an apparatus for reducing the heat content of an air stream comprising means (a fan, see col. 4, line 43) for directing a first air stream (50) through a first set of passageways (53) of a generally diamond shaped heat exchanger (40), means (the fan) for directing a second air stream (52) through a separate, second set of passageways (55) of the generally diamond shaped heat exchanger, and means (walls 42 and 54) for transferring heat from said first air stream into said second air stream in Figs. 2 and 3 and col. 3, line 39 to col. 7, line 14.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 5, 6, 8-13 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vouche (US 6,247,682 B1) in view of Stark (US 5,816,315).

With regard to claims 1 and 23, Vouche discloses a cooling tower having an outside and an inside and a longitudinal axis, comprising an evaporative media (45), a liquid distribution system (10) that distributes hot liquid over said evaporative media, a heat exchanger (4) that transfers heat from a first air stream (C3) into a second air stream (C3), said heat exchanger comprising at least one heat exchanger pack (44) that includes a first set of passageways (4A) and a second set of passageways (4B), and an air current generator (fan 13) that directs said first air stream through said evaporative media and through the first set of passageways and wherein said air current generator directs said second air stream through said second set of passageways in Figs. 2-8 and col. 3, line 59 to col. 6, line 34.

Vouche does not disclose the heat exchanger comprising at least one generally diamond shaped heat exchanger pack.

Stark teaches a similar heat exchanger comprising at least one generally diamond shaped heat exchanger pack (40) in Fig. 2 and col. 3, line 67 to col. 6, line 49.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the generally diamond shaped heat exchanger packs of Stark into the cooling tower of Vouche to provide passageways that are orientated at a diagonal angle to facilitate drainage of condensed water from the heat exchanger passageways, as is well known in the art.

With regard to claim 5, Vouche discloses the cooling tower comprising a reservoir (8) that captures condensed water out of said first air stream in Fig. 2 and col. 4, lines 12-45.

With regard to claim 6, Vouche discloses the evaporative media being a counterflow evaporative media in col. 5, lines 1-4.

With regard to claim 8, Vouche discloses the cooling tower comprising a drift eliminator (11) in Fig. 2 and col. 4, lines 23-45.

With regard to claims 9-11, Vouche discloses the cooling tower comprising a first set of doors (dampers at inlet 1) that control air flow through the first set of air passages

and a second set of doors (dampers at inlet 2) that control air flow through said second set of passages in Fig. 2, col. 4, lines 1-45 and col. 6, lines 57-61.

With regard to claim 12, Vouche discloses the liquid distribution system (10) comprising a plurality of nozzles that distribute hot water over said evaporative media in Fig. 2.

With regard to claim 13, Stark discloses the first passageway and the second passageway being formed by sandwiching thin sheets (40,52) together in Fig. 3 and col. 6, line 63 to col. 7, line 14.

9. Claims 1, 2, 13 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turbin (US 3,792,572) in view of Lefevre (US 4,562,015) and Stark (US 5,816,315).

With regard to claims 1, 2, 22 and 23, Turbin discloses a cooling tower (not shown, see col. 1, lines 23-25) having an outside and an inside and a longitudinal axis, comprising an evaporative media and a liquid distribution system that distributes hot liquid over said evaporative media, and a separate heat exchanger (12) that transfers heat from a first air stream (wet gas entering inlet 26) into a second air stream (ambient air in chamber 20), said heat exchanger comprising at least one heat exchanger pack (12) that includes a first set of passageways (13) and a second set of passageways

(shell around tubes 13), and an air current generator (not shown, part of the cooling tower) that directs said first air stream through said evaporative media and through the first set of passageways and a second air current generator (20) that directs said second air stream through said second set of passageways in Figs.1 and 2 and col. 2, line 58 to col. 3, line 55.

Turbin does not disclose the cooling tower comprising the heat exchanger, a single air current generator directing both the first and second air currents, or the heat exchanger comprising at least one generally diamond shaped heat exchanger pack.

Lefevre discloses a cooling tower comprising a fan (23) in Fig. 1 and col. 1, line 5 to col. 6, line 28.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the heat exchanger of Turbin directly into the cooling tower of Lefevre to eliminate the need for the separate heat exchanger housing and the second fan to reduce manufacturing costs.

Stark teaches a similar heat exchanger comprising at least one generally diamond shaped heat exchanger pack (40), wherein said at least one generally diamond shaped heat exchanger pack is a plurality of generally diamond shaped heat exchanger packs having said first and said second sets of passageways, wherein said plurality of generally diamond shaped heat exchanger packs are positioned adjacent to each other so that a portion of each of said plurality of generally diamond shaped heat exchanger packs abut one another so that the heat exchanger extends across the inside of the cooling tower to form a single tier heat exchanger, wherein sealing means

(beads 43) seal abutting portions of the plurality of heat exchanger packs in Figs. 2 and 7 and col. 3, line 67 to col. 6, line 49.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the heat exchanger comprising a plurality of generally diamond shaped heat exchanger packs of Stark into the cooling tower of Turbin and Lefevre to provide passageways that orientated at a diagonal angle to facilitate drainage of condensed water from the heat exchanger passageways, as is well known in the art.

With regard to claim 13, Stark discloses the first passageway and the second passageway being formed by sandwiching thin sheets (40,52) together in Fig. 3 and col. 6, line 63 to col. 7, line 14.

With regard to claim 21, Turbin, Lefevre and Stark do not disclose the plurality of diamond shaped heat exchanger packs being positioned adjacent one another along the longitudinal axis to form a two-tier heat exchanger. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to duplicate the single-tier heat exchanger of Stark in that duplicating parts for a multiplied effect is merely a choice of design. See St. Regis Paper Co. v. Bemis Co. Inc., 193 USPQ 8,11.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vouche (US 6,247,682 B1) and Stark (US 5,816,315) as applied to claim 1 above, and further in view of Lefevre (US 4,562,015).

Vouche does not disclose the evaporative media being a crossflow evaporative media or the first and second air streams having a flow rate between 10 and 80 pounds of dry air per square foot per minute.

Lefevre discloses a similar cooling tower having a crossflow evaporative media in Fig. 1 and col. 1, lines 6-21.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the crossflow evaporative media of Lefevre for the counterflow evaporative media of Vouche in that such are alternate evaporative media in the art for contacting a gas and a liquid, mere substitution of one known type of evaporative contact media for another in the art being within the scope of one having ordinary skill in the art.

11. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vouche (US 6,247,682 B1) and Stark (US 5,816,315) or Turbin (US 3,792,572), Lefevre (US 4,562,015) and Stark (US 5,816,315) as applied to claim 13 above, and further in view of Norback (US 4,099,928).

Vouche, Turbin, Stark and Lefevre do not disclose the heat exchanger further comprising positively raised edges along two parallel edges of the thin sheet material and negatively raised edges along the two parallel edges of the thin sheet perpendicular

to the edges having the positively raised edges, said first passageway being formed by reversing two sheets and bonding the positively raised edges on one side together and the positively raised edges on the other side together, and said second passageways being formed by reversing two sheets and bonding the negatively raised edges on one side together and the negatively raised edges on the other side together, wherein the first passageways can be oriented perpendicular to the second passageways by alternately bonding the negatively raised edges and the positively raised edges in a set of thin sheets.

Norback discloses a heat exchanger (10) wherein a first set of passageways and a second set of passageways are formed by sandwiching thin sheets (12) together, the heat exchanger further comprising positively raised edges (23,24) along two parallel edges of the thin sheet material and negatively raised edges (25,26) along the two parallel edges of the thin sheet perpendicular to the edges having the positively raised edges, said first passageway being formed by reversing two sheets and bonding the positively raised edges on one side together and the positively raised edges on the other side together, and said second passageways being formed by reversing two sheets and bonding the negatively raised edges on one side together and the negatively raised edges on the other side together, wherein the first passageways can be oriented perpendicular to the second passageways by alternately bonding the negatively raised edges and the positively raised edges in a set of thin sheets in Figs. 1-4 and col. 2, line 9 to col. 4, line 26.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the heat exchanger design of Norback into the heat exchanger of Stark to allow the heat exchanger to be produced in any dimension in a simple and inexpensive manner to lower the overall cost of the cooling tower, as suggested by Norback in col. 1, lines 32-38.

12. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vouche (US 6,247,682 B1), Stark (US 5,816,315) and Norback (US 4,099,928) or Turbin (US 3,792,572), Lefevre (US 4,562,015), Stark (US 5,816,315) and Norback (US 4,099,928) as applied to claim 15 above, and further in view of Ospelt (4,378,837).

Vouche, Turbin, Lefevre, Stark and Norback do not disclose the heat exchanger further comprising positively and negatively formed buttons in the thin sheets for maintaining the passages open under differential pressure between said first passageways and said second passageways, wherein the positively formed buttons on a first sheet press against positively formed buttons on a first adjacent sheet and the negatively formed buttons press against the negatively formed buttons on a second adjacent sheet, wherein the positively formed buttons are configured to reduce resistance to flow of the first air stream in a first direction and the negatively formed buttons are configured to reduce resistance to flow of the second air stream in a second direction.

Ospelt discloses a heat exchanger comprising positively and negatively formed buttons (3) in the thin sheets (1) for maintaining the passages open under differential

pressure between said first passageways and said second passageways, wherein the positively formed buttons on a first sheet press against positively formed buttons on a first adjacent sheet and the negatively formed buttons press against the negatively formed buttons on a second adjacent sheet, wherein the positively formed buttons are configured to reduce resistance to flow of the first air stream in a first direction and the negatively formed buttons are configured to reduce resistance to flow of the second air stream in a second direction in Figs. 1-3 and col. 2, line 34 to col. 3, line 43.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the raised buttons of Ospelt into the cooling tower heat exchanger of Stark and Norback to provide means to hold the sheets at a desired distance from one another to maintain the first and second sets of passages open, as suggested by Ospelt in col. 2, lines 39-41.

13. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vouche (US 6,247,682 B1) and Stark (US 5,816,315) or Turbin (US 3,792,572), Lefevre (US 4,562,015) and Stark (US 5,816,315) as applied to claim 13 above, and further in view of Cates (US 4,119,140).

Vouche, Turbin, Lefevre and Stark do not disclose the sheets being made form synthetic resin film.

Cates discloses a similar heat exchanger having sheets formed from PVC in col. 8, lines 14-38.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the PVC material of Cates into the heat exchanger of Stark to allow the sheets to be formed from a low cost material.

Allowable Subject Matter

14. Claims 3 and 4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter:

The prior art made of record doers not teach or fairly suggest the cooling tower of claim 2 further comprising the first plurality of air ducts and second plurality of air ducts recited in claim 3.

Conclusion

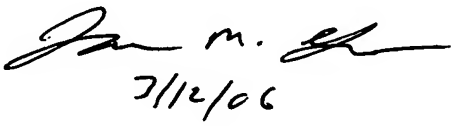
16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Hsieh, Wright, Goto et al., Maisotsensko, Merrill et al. and Tinguee, Jr. references disclose similar cooling towers and heat exchangers.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Greene whose telephone number is (571) 272-1157. The examiner can normally be reached on Monday - Friday (9:00 AM to 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Greene
Primary Examiner
Art Unit 1724



jmg
March 12, 2006